

CLAIMS

1 1. (currently amended) In a spread-spectrum receiver, a method for processing a received
2 analog spread-spectrum signal, comprising:
3 determining whether to attenuate the received analog spread-spectrum signal;
4 based on the attenuation determination, selectively attenuating the received analog spread-
5 spectrum signal to generate a selectively attenuated analog spread-spectrum signal;
6 digitizing the selectively attenuated analog spread-spectrum signal to generate a digital spread-
7 spectrum signal;
8 filtering the digital spread-spectrum signal in an attempt to compensate for interference in the
9 received analog spread-spectrum signal to generate a filtered digital spread-spectrum signal; and
10 de-spreading the filtered digital spread-spectrum signal to generate a de-spread digital signal,
11 wherein:
12 the attenuation determination is based on the amplitude of the digital spread-spectrum
13 signal only after the digitizing and prior to the interference-compensation filtering and the de-spreading.

1 2. (original) The invention of claim 1, wherein the filtering attempts to compensate for off-
2 channel interference in the received analog spread-spectrum signal.

1 3. (original) The invention of claim 1, wherein the selectively attenuated analog spread-
2 spectrum signal has a negative signal-to-noise ratio (SNR).

1 4. (original) The invention of claim 1, wherein:
2 the received analog spread-spectrum signal is attenuated when the amplitude of the digital
3 spread-spectrum signal is greater than an upper threshold; and
4 the received analog spread-spectrum signal is not attenuated when the amplitude of the digital
5 spread-spectrum signal is less than a lower threshold, wherein the upper threshold is greater than the
6 lower threshold.

1 5. (original) The invention of claim 4, wherein the upper threshold is greater than the lower
2 threshold by an amount greater than the level of selective attenuation in order to provide hysteresis in the
3 attenuation determination.

6. (original) The invention of claim 1, wherein:
the received analog spread-spectrum signal is a radio frequency (RF) signal; and
further comprising:
converting the RF signal to an intermediate frequency (IF) prior to the digitization; and
converting the IF signal to baseband after digitization.

7. (original) The invention of claim 6, wherein the filtering and the de-spreading are implemented at baseband.

8. (original) The invention of claim 1, wherein:
the filtering attempts to compensate for off-channel interference in the received analog spread-spectrum signal;
the selectively attenuated analog spread-spectrum signal has a negative signal-to-noise ratio (SNR);
the received analog spread-spectrum signal is attenuated when the amplitude of the digital spread-spectrum signal is greater than an upper threshold;
the received analog spread-spectrum signal is not attenuated when the amplitude of the digital spread-spectrum signal is less than a lower threshold;
the upper threshold is greater than the lower threshold by an amount greater than the level of selective attenuation in order to provide hysteresis in the attenuation determination;
the received analog spread-spectrum signal is a radio frequency (RF) signal;
further comprising:
converting the RF signal to an intermediate frequency (IF) prior to the digitization; and
converting the IF signal to baseband after digitization; and
the filtering and the de-spreading are implemented at baseband.

9. (currently amended) A spread-spectrum receiver, comprising:
a variable attenuator adapted to selectively attenuate a received analog spread-spectrum signal to generate a selectively attenuated analog spread-spectrum signal;
an analog-to-digital converter (ADC) adapted to digitize the selectively attenuated analog spread-spectrum signal to generate a digital spread-spectrum signal;
an interference-compensation filter adapted to filter the digital spread-spectrum signal in an attempt to compensate for interference in the received analog spread-spectrum signal to generate a filtered digital spread-spectrum signal;

9 a digital processor adapted to de-spread the filtered digital spread-spectrum signal to generate a
10 de-spread digital signal; and

11 a controller adapted to control the variable attenuator based on the amplitude of the digital
12 spread-spectrum signal only after the digitizing by the ADC and prior to the interference-compensation
13 filtering by the interference-compensation filter and the de-spreading of the digital processor.

1 10. (original) The invention of claim 9, wherein the filter is adapted to attempt to
2 compensate for off-channel interference in the received analog spread-spectrum signal.

1 11. (canceled)

1 12. (original) The invention of claim 9, wherein:
2 the controller is adapted to control the variable attenuator to attenuate the received analog
3 spread-spectrum signal when the amplitude of the digital spread-spectrum signal is greater than an upper
4 threshold; and
5 the controller is adapted to control the variable attenuator not to attenuate the received analog
6 spread-spectrum signal when the amplitude of the digital spread-spectrum signal is less than a lower
7 threshold, wherein the upper threshold is greater than the lower threshold.

1 13. (original) The invention of claim 12, wherein the upper threshold is greater than the
2 lower threshold by an amount greater than the level of selective attenuation in order to provide hysteresis
3 in the attenuation determination.

1 14. (original) The invention of claim 9, wherein:
2 the received analog spread-spectrum signal is a radio frequency (RF) signal; and
3 further comprising:
4 a mixer adapted to convert the RF signal to an intermediate frequency (IF) prior to the
5 digitization; and
6 a digital downconverter adapted to convert the IF signal to baseband after digitization.

1 15. (original) The invention of claim 14, wherein the filter and the digital processor are
2 adapted to operate at baseband.

1 16. (previously presented) The invention of claim 9, wherein:
2 the filter is adapted to attempt to compensate for off-channel interference in the received analog
3 spread-spectrum signal;
4 the controller is adapted to control the variable attenuator to attenuate the received analog
5 spread-spectrum signal when the amplitude of the digital spread-spectrum signal is greater than an upper
6 threshold;
7 the controller is adapted to control the variable attenuator not to attenuate the received analog
8 spread-spectrum signal when the amplitude of the digital spread-spectrum signal is less than a lower
9 threshold;
10 the upper threshold is greater than the lower threshold by an amount greater than the level of
11 selective attenuation in order to provide hysteresis in the attenuation determination;
12 the received analog spread-spectrum signal is a radio frequency (RF) signal;
13 further comprising:
14 a mixer adapted to convert the RF signal to an intermediate frequency (IF) prior to the
15 digitization; and
16 a digital downconverter adapted to convert the IF signal to baseband after digitization;
17 and
18 the filter and the digital processor are adapted to operate at baseband.

1 17. (canceled)

1 18. (previously presented) The invention of claim 1, wherein the attenuation determination
2 is based on the amplitude of the digital spread-spectrum signal in a time domain.

1 19. (previously presented) The invention of claim 6, wherein the attenuation determination
2 is based on the amplitude of the digital IF signal.

1 20. (previously presented) The invention of claim 1, wherein:
2 the received analog spread-spectrum signal is attenuated when the amplitude of the digital
3 spread-spectrum signal is greater than a first threshold;
4 the received analog spread-spectrum signal is not attenuated when the amplitude of the digital
5 spread-spectrum signal is less than a second threshold, wherein the first threshold is greater than or equal
6 to the second threshold;

7 a transition from the received analog spread-spectrum signal not being attenuated to the received
8 analog spread-spectrum signal being attenuated occurs after (i) determining a first duration that the
9 amplitude of the digital spread-spectrum signal is greater than the first threshold and (ii) comparing the
10 first duration to a first specified amount of time to determine that the first duration is greater than the first
11 specified amount of time; and

12 a transition from the received analog spread-spectrum signal being attenuated to the received
13 analog spread-spectrum signal not being attenuated occurs after (i) determining a second duration that the
14 amplitude of the digital spread-spectrum signal is less than the second threshold and (ii) comparing the
15 second duration to a second specified amount of time to determine that the second duration is greater
16 than the second specified amount of time.

1 21. (previously presented) The invention of claim 1, wherein the attenuation determination
2 is further based on *a priori* knowledge of maximum expected interference-to-carrier ratio.

1 22-23. (canceled)

1 24. (previously presented) The invention of claim 1, wherein the attenuation determination
2 is independent of any determination of bit error rate.

1 25. (canceled)

1 26. (previously presented) The invention of claim 9, wherein the selectively attenuated
2 analog spread-spectrum signal has a negative signal-to-noise ratio (SNR).

1 27. (canceled)

1 28. (new) In a spread-spectrum receiver, a method for processing a received analog spread-
2 spectrum signal, comprising:

3 determining whether to attenuate the received analog spread-spectrum signal;
4 based on the attenuation determination, selectively attenuating the received analog spread-
5 spectrum signal to generate a selectively attenuated analog spread-spectrum signal;

6 digitizing the selectively attenuated analog spread-spectrum signal to generate a digital spread-
7 spectrum signal;

8 filtering the digital spread-spectrum signal in an attempt to compensate for interference in the
9 received analog spread-spectrum signal to generate a filtered digital spread-spectrum signal; and
10 de-spreading the filtered digital spread-spectrum signal to generate a de-spread digital signal,
11 wherein:
12 the attenuation determination is based on the amplitude of the digital spread-spectrum
13 signal prior to the interference-compensation filtering and the de-spreading;
14 the filtering attempts to compensate for off-channel interference in the received analog
15 spread-spectrum signal;
16 the selectively attenuated analog spread-spectrum signal has a negative signal-to-noise
17 ratio (SNR);
18 the received analog spread-spectrum signal is attenuated when the amplitude of the
19 digital spread-spectrum signal is greater than an upper threshold;
20 the received analog spread-spectrum signal is not attenuated when the amplitude of the
21 digital spread-spectrum signal is less than a lower threshold;
22 the upper threshold is greater than the lower threshold by an amount greater than the
23 level of selective attenuation in order to provide hysteresis in the attenuation determination;
24 the received analog spread-spectrum signal is a radio frequency (RF) signal;
25 further comprising:
26 converting the RF signal to an intermediate frequency (IF) prior to the
27 digitization; and
28 converting the IF signal to baseband after digitization; and
29 the filtering and the de-spreading are implemented at baseband.

1 29. (new) In a spread-spectrum receiver, a method for processing a received analog spread-
2 spectrum signal, comprising:
3 determining whether to attenuate the received analog spread-spectrum signal;
4 based on the attenuation determination, selectively attenuating the received analog spread-
5 spectrum signal to generate a selectively attenuated analog spread-spectrum signal;
6 digitizing the selectively attenuated analog spread-spectrum signal to generate a digital spread-
7 spectrum signal;
8 filtering the digital spread-spectrum signal in an attempt to compensate for interference in the
9 received analog spread-spectrum signal to generate a filtered digital spread-spectrum signal; and
10 de-spreading the filtered digital spread-spectrum signal to generate a de-spread digital signal,
11 wherein:

the attenuation determination is based on the amplitude of the digital spread-spectrum signal prior to the interference-compensation filtering and the de-spreading;

the received analog spread-spectrum signal is attenuated when the amplitude of the digital spread-spectrum signal is greater than a first threshold;

the received analog spread-spectrum signal is not attenuated when the amplitude of the digital spread-spectrum signal is less than a second threshold, wherein the first threshold is greater than or equal to the second threshold;

a transition from the received analog spread-spectrum signal not being attenuated to the received analog spread-spectrum signal being attenuated occurs after (i) determining a first duration that the amplitude of the digital spread-spectrum signal is greater than the first threshold and (ii) comparing the first duration to a first specified amount of time to determine that the first duration is greater than the first specified amount of time; and

a transition from the received analog spread-spectrum signal being attenuated to the received analog spread-spectrum signal not being attenuated occurs after (i) determining a second duration that the amplitude of the digital spread-spectrum signal is less than the second threshold and (ii) comparing the second duration to a second specified amount of time to determine that the second duration is greater than the second specified amount of time.

30. (new) A spread-spectrum receiver, comprising:

a variable attenuator adapted to selectively attenuate a received analog spread-spectrum signal to generate a selectively attenuated analog spread-spectrum signal;

an analog-to-digital converter (ADC) adapted to digitize the selectively attenuated analog spread-spectrum signal to generate a digital spread-spectrum signal;

an interference-compensation filter adapted to filter the digital spread-spectrum signal in an attempt to compensate for interference in the received analog spread-spectrum signal to generate a filtered digital spread-spectrum signal;

a digital processor adapted to de-spread the filtered digital spread-spectrum signal to generate a de-spread digital signal; and

a controller adapted to control the variable attenuator based on the amplitude of the digital spread-spectrum signal prior to the interference-compensation filter and the digital processor, wherein:

the filter is adapted to attempt to compensate for off-channel interference in the received analog spread-spectrum signal;

the controller is adapted to control the variable attenuator to attenuate the received analog spread-spectrum signal when the amplitude of the digital spread-spectrum signal is greater than an upper threshold;

the controller is adapted to control the variable attenuator not to attenuate the received analog spread-spectrum signal when the amplitude of the digital spread-spectrum signal is less than a lower threshold;

the upper threshold is greater than the lower threshold by an amount greater than the level of selective attenuation in order to provide hysteresis in the attenuation determination;

the received analog spread-spectrum signal is a radio frequency (RF) signal;

further comprising:

a mixer adapted to convert the RF signal to an intermediate frequency (IF) prior to the digitization; and

a digital downconverter adapted to convert the IF signal to baseband after digitization; and

the filter and the digital processor are adapted to operate at baseband.